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USPT,PGPB,JPAB,EPAB,DWPI,TDBD	129 and backup same database or archiv\$	13935	<a href="#">L30</a>

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USPT,PGPB,JPAB,EPAB,DWPI,TDBD	patent same database	2359	<a href="#">L23</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l21 and document same format	2	<a href="#">L22</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l20 and attribute	20	<a href="#">L21</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	backup adj database	160	<a href="#">L20</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l13 and backup adj database	135	<a href="#">L19</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l13 and copy information	1485991	<a href="#">L18</a>
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USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l13 and attribute	46231	<a href="#">L14</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	copy\$ information	6766669	<a href="#">L13</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l11 and document same format	8	<a href="#">L12</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	backup adj database or backup adj data adj base	190	<a href="#">L11</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l9 and attribute	2194	<a href="#">L10</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	document same format same archive or backup	51098	<a href="#">L9</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l6 and format	85	<a href="#">L8</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l5 and format	30918	<a href="#">L7</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	l5 and document adj attribute	140	<a href="#">L6</a>
USPT,PGPB,JPAB,EPAB,DWPI,TDBD	backup database or backup data adj base	160147	<a href="#">L5</a>
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USPT,PGPB,JPAB,EPAB,DWPI,TDBD	((707/202  707/203  707/204 )!.CCLS. )	974	<a href="#">L1</a>

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L36: Entry 19 of 22

File: USPT

Nov 4, 1997

US-PAT-NO: 5684984

DOCUMENT-IDENTIFIER: US 5684984 A

TITLE: Synchronization and replication of object databases

DATE-ISSUED: November 4, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jones; Anne	Redwood City	CA	N/A	N/A
Zarmer; Craig	Mountain View	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Apple Computer, Inc.	Cupertino	CA	N/A	N/A	02

APPL-NO: 8/ 314951

DATE FILED: September 29, 1994

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 395/610; 395/611, 395/613, 395/614, 395/616, 395/479, 395/342

US-CL-CURRENT: 707/10; 345/342, 707/100, 707/102, 707/103, 711/152

FIELD-OF-SEARCH: 395/650, 395/157, 395/600, 395/425, 395/610, 395/611, 395/613, 395/614, 395/616, 395/479, 395/342, 364/408, 364/401, 348/7, 379/207

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>4799156</u>	January 1989	Shavit et al.	364/401
<input type="checkbox"/>	<u>4961137</u>	October 1990	Augusteijn et al.	364/200
<input type="checkbox"/>	<u>5093911</u>	March 1992	Parks et al.	395/600
<input type="checkbox"/>	<u>5220501</u>	June 1993	Lawlor et al.	364/408
<input type="checkbox"/>	<u>5220657</u>	June 1993	Bly et al.	395/425
<input type="checkbox"/>	<u>5241673</u>	August 1993	Schelris	395/600
<input type="checkbox"/>	<u>5287447</u>	February 1994	Miller et al.	395/157
<input type="checkbox"/>	<u>5303375</u>	April 1994	Collins et al.	395/650
<input type="checkbox"/>	<u>5307456</u>	April 1994	MacKay	395/154
<input type="checkbox"/>	<u>5307490</u>	April 1994	Davidson et al.	395/650
<input type="checkbox"/>	<u>5319455</u>	June 1994	Hoarty et al.	348/7
<input type="checkbox"/>	<u>5404505</u>	April 1995	Levinson et al.	395/600
<input type="checkbox"/>	<u>5418844</u>	May 1995	Morrissey et al.	379/207

## OTHER PUBLICATIONS

Hao et al., "VIZIR: An Integrated Environment for Distributed Program Visualization", IEEE 1995.  
 Lamb et al.; "Lan-Based Office for the Enterprise, A Case Study", IEEE, 1994.  
 Natale et al., "Dynamic End-to End Guarantees in Distributed Real Time Systems", IEEE, 1994.  
 Gersham et al., "Use of Hypermedia for Corporate Knowledge Dissemination"; IEEE 1993.  
 Haefner, "Method For Building A Hypermedia Information Management Tool", PCT/World Intellectual Property Organization, 10913 World, pp. 1-66, Sep. 20, 1990.  
 Wolf, "The (Second Phase of the) Revolution has Begun", Wired Magazine, Wired Ventures Ltd., p. (116-21; 150-2) (1994).

ART-UNIT: 237

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Lewis; C.

ATTY-AGENT-FIRM: Burns, Doane, Swecker &amp; Mathis, L.L.P.

## ABSTRACT:

The present invention, generally speaking, provides a method of synchronizing information between a plurality of sites and a central location that solves number of potentially "thorny" problems of distributed database systems in an elegant and efficient manner. The first issue involves synchronizing different copies of an item on machines that are not continuously linked at which each copy may be changed independently. Rather than attempting to formulate a set of synchronization policies generally applicable to all items in all instances, synchronization policies are moved from the database engine to the items themselves. The second issue involves lifetime--knowing, given a complex set of interrelationship of items, when an item may be safely deleted. This problem is addressed by providing an interested party mechanism whereby items may "express interest" in each other. When no item is interested in a particular item, that item may safely "go away".

11 Claims, 15 Drawing figures

**WEST**

Generate Collection

L21: Entry 17 of 20

File: USPT

Apr 1, 1997

US-PAT-NO: 5617568

DOCUMENT-IDENTIFIER: US 5617568 A

TITLE: System and method for supporting file attributes on a distributed file system without native support therefor

DATE-ISSUED: April 1, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ault; Michael B.	Austin	TX	N/A	N/A
Plassmann; Ernst R.	Pflugerville	TX	N/A	N/A
Rich; Bruce A.	Round Rock	TX	N/A	N/A
Wilkes; Michael D.	Austin	TX	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE	CODE
International Business Machines Corporation	Armonk	NY	N/A	N/A	02	

APPL-NO: 8/ 355868

DATE FILED: December 14, 1994

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 395/612; 395/712

US-CL-CURRENT: 707/101; 717/11

FIELD-OF-SEARCH: 395/600, 395/700, 395/612, 395/712, 364/DIG.1, 364/DIG.2

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

Search ALL

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> 4644468	February 1987	Doster et al.	395/200.02
<input type="checkbox"/> 4816826	March 1989	Munter et al.	340/825.52
<input type="checkbox"/> 4916608	April 1990	Shultz	395/650
<input type="checkbox"/> 4982324	January 1991	McConaughy et al.	395/200.09
<input type="checkbox"/> 4999766	March 1991	Peters et al.	395/600
<input type="checkbox"/> 5113519	May 1992	Johnson et al.	395/600
<input type="checkbox"/> 5218696	June 1993	Baird et al.	395/600
<input type="checkbox"/> 5257369	October 1993	Skeen et al.	395/650
<input type="checkbox"/> 5317722	May 1994	Evans	395/500
<input type="checkbox"/> 5317728	May 1994	Tervis et al.	395/600
<input type="checkbox"/> 5321816	June 1994	Rogan et al.	395/200.01
<input type="checkbox"/> 5333317	July 1994	Dann	395/600
<input type="checkbox"/> 5339435	August 1994	Lubkin et al.	395/700
<input type="checkbox"/> 5371885	December 1994	Letwin	395/600
<input type="checkbox"/> 5408619	April 1995	Oran	395/325
<input type="checkbox"/> 5412808	May 1995	Bauer	395/600
<input type="checkbox"/> 5421012	May 1995	Khoyi et al.	395/650
<input type="checkbox"/> 5434974	July 1995	Loucks et al.	395/700
<input type="checkbox"/> 5497463	March 1996	Stein et al.	395/200.03
<input type="checkbox"/> 5499358	March 1996	Nevarez	395/600

## OTHER PUBLICATIONS

"OSF's Distributed Computing Environment", R. Kumar, Aixpert, IBM Corporation, fall, 1991, pp. 22-29.  
 "An Overview of the OSF DCE Distributed File System", G. Lebovitz, Aixpert, IBM, Feb. 1992, pp. 55-64.  
 "The Distributed File System (DFS) for AIX/6000", IBM, Doc. No. GG24-4255-00, May 1994, pp. 1-15.  
 "Understanding, DCE", W. Rosenberry et al, O'Reilly & Associates, Inc. Publishers, Sep. 1992, pp. 6-100.

ART-UNIT: 237

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Von Buhr; Maria N.

ATTY-AGENT-FIRM: Carwell; Robert M.

## ABSTRACT:

A system and method to provide native support in a distributed computing environment distributed file system for an operating system's extended file attributes. Such attributes remain invisible in the namespace which the operating system's distributed file system clients may access. A directory of the form \*.sub.-- for a file in DFS namespace is created for which extended attributes (EA) are required, with a subdirectory thereunder whose name is that of the file. Extended attributes are filed under this \*.sub.-- directory having filenames of the attributes' names. Provision is made for discriminating EAs and for efficiently accessing total EA size and number of critical EAs, by cumulating and storing them in an additional file under the subdirectory.

18 Claims, 12 Drawing figures

**WEST**☐ **Generate Collection**

L40: Entry 9 of 36

File: USPT

Mar 16, 1999

US-PAT-NO: 5884328

DOCUMENT-IDENTIFIER: US 5884328 A

TITLE: System and method for synchronizing a large database and its replica

DATE-ISSUED: March 16, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mosher, Jr.; Malcolm	Los Gatos	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Tandem Computers, Inc.	Cupertino	CA	N/A	N/A	02

APPL-NO: 8/ 920401

DATE FILED: August 29, 1997

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 707/202; 707/702

US-CL-CURRENT: 707/202

FIELD-OF-SEARCH: 707/10, 707/102, 707/5, 707/202, 707/702, 395/185, 395/182.3, 395/182.4

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

☐ Search Selected☐ Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>5170480</u>	December 1992	Mohan et al.	707/201
<input type="checkbox"/>	<u>5404508</u>	April 1995	Konrad et al.	707/202
<input type="checkbox"/>	<u>5455946</u>	October 1995	Mohan et al.	707/202
<input type="checkbox"/>	<u>5561795</u>	October 1996	Sarkar	707/202
<input type="checkbox"/>	<u>5615364</u>	March 1997	Marks	707/202
<input type="checkbox"/>	<u>5737738</u>	April 1998	Sharman	707/201
<input type="checkbox"/>	<u>5740433</u>	April 1998	Carr et al.	707/202

ART-UNIT: 271

PRIMARY-EXAMINER: Lintz; Paul R.

ASSISTANT-EXAMINER: Colbert; Ella

ATTY-AGENT-FIRM: Williams; Gary S. Flehr Hohbach Test Ablritton &amp; Herbert LLP

ABSTRACT:

A primary computer system maintains a master audit trail of changes made to the primary database. A fuzzy database copy of a portion of the primary database is generated by copying the primary database portion using a shared load operation so as to copy the primary database portion without regard to changes being made to the primary database portion while the fuzzy copy is being generated. The fuzzy database copy is installed at a backup computer system. An extractor process executed by the primary computer system extracts audit records from the master audit trail corresponding to the primary database portion, and sends audit information corresponding to extracted audit records to the backup system. The sent audit information includes audit information corresponding to all audit records, including both update and backout audit records, representing changes made to the primary database portion by (A) transactions while the fuzzy database copy was generated, and (B) transactions that were active while the fuzzy database copy was generated and that continue to be active thereafter. The sent audit information also includes audit information corresponding to all audit records representing updates made to the primary database portion by the transactions after the fuzzy database copy was generated. At the backup system the audit information sent by the extractor process is received and applied to the fuzzy database copy so as to generate a synchronized backup database, by performing redos of the database updates corresponding to the audit information sent to the backup system.

10 Claims, 20 Drawing figures



**WEST**

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L40: Entry 19 of 36

File: USPT

Jul 7, 1998

US-PAT-NO: 5778395

DOCUMENT-IDENTIFIER: US 5778395 A

TITLE: System for backing up files from disk volumes on multiple nodes of a computer network

DATE-ISSUED: July 7, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Whiting; Douglas L.	Carlsbad	CA	N/A	N/A
Dilatush; Tom	Chula Vista	CA	N/A	N/A

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Stac, Inc.	Carlsbad	CA	N/A	N/A	02

APPL-NO: 8/ 546727

DATE FILED: October 23, 1995

INT-CL: [6] G06F 17/30

US-CL-ISSUED: 707/204; 707/10

US-CL-CURRENT: 707/204; 707/10

FIELD-OF-SEARCH: 395/601, 395/610, 395/616, 395/620, 395/621, 395/489, 395/575, 395/182.03, 395/700, 395/618, 380/50, 380/49, 341/106, 707/204, 707/10

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>5008936</u>	April 1991	Hamilton et al.	380/50
<input type="checkbox"/>	<u>5123047</u>	June 1992	Rosenow	380/50
<input type="checkbox"/>	<u>5126739</u>	June 1992	Whiting et al.	341/105
<input type="checkbox"/>	<u>5133065</u>	July 1992	Cheffetz et al.	395/575
<input type="checkbox"/>	<u>5163148</u>	November 1992	Walls	707/204
<input type="checkbox"/>	<u>5175766</u>	December 1992	Hamilton	380/49
<input type="checkbox"/>	<u>5193154</u>	March 1993	Kitajima et al.	707/204
<input type="checkbox"/>	<u>5276867</u>	January 1994	Kenley et al.	707/204
<input type="checkbox"/>	<u>5301286</u>	April 1994	Rajani	711/202
<input type="checkbox"/>	<u>5386545</u>	January 1995	Gombos, Jr. et al.	707/204
<input type="checkbox"/>	<u>5414850</u>	May 1995	Whiting	395/700
<input type="checkbox"/>	<u>5446888</u>	August 1995	Pyne	707/10
<input type="checkbox"/>	<u>5448718</u>	September 1995	Cohn et al.	711/4
<input type="checkbox"/>	<u>5479654</u>	December 1995	Squibb	707/201
<input type="checkbox"/>	<u>5495607</u>	February 1996	Pisello et al.	395/600
<input type="checkbox"/>	<u>5515502</u>	May 1996	Wood	395/182.13
<input type="checkbox"/>	<u>5537533</u>	July 1996	Staheli et al.	395/182.03
<input type="checkbox"/>	<u>5537585</u>	July 1996	Blickenstaff et al.	395/600
<input type="checkbox"/>	<u>5546534</u>	August 1996	Malcolm	395/182.04
<input type="checkbox"/>	<u>5548750</u>	August 1996	Larson et al.	707/204
<input type="checkbox"/>	<u>5559991</u>	September 1996	Kanfi	395/489
<input type="checkbox"/>	<u>5596706</u>	January 1997	Shimazaki et al.	395/182.04
<input type="checkbox"/>	<u>5615364</u>	March 1997	Marks	707/202
<input type="checkbox"/>	<u>5642505</u>	June 1997	Fushimi	707/204
<input type="checkbox"/>	<u>5664186</u>	September 1997	Bennett et al.	707/204

## FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0466389	July 1991	EPX	
0541281	October 1992	EPX	
0650122	October 1992	EPX	
9417474	August 1994	WOX	

ART-UNIT: 271

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Coby; Frantz

ATTY-AGENT-FIRM: Irell &amp; Manella LLP

## ABSTRACT:

A system for backing up files from disk volumes on multiple nodes of a computer network to a common random-access backup storage means. As part of the backup process, duplicate files (or portions of files) may be identified across nodes, so

that only a single copy of the contents of the duplicate files (or portions thereof) is stored in the backup storage means. For each backup operation after the initial backup on a particular volume, only those files which have changed since the previous backup are actually read from the volume and stored on the backup storage means. In addition, differences between a file and its version in the previous backup may be computed so that only the changes to the file need to be written on the backup storage means. All of these enhancements significantly reduce both the amount of storage and the amount of network bandwidth required for performing the backup. Even when the backup data is stored on a shared-file server, data privacy can be maintained by encrypting each file using a key generated from a fingerprint of the file contents, so that only users who have a copy of the file are able to produce the encryption key and access the file contents. To view or restore files from a backup, a user may mount the backup set as a disk volume with a directory structure identical to that of the entire original disk volume at the time of the backup.

24 Claims, 14 Drawing figures